

**Before the  
Federal Communications Commission  
Washington, DC 20554**

In the Matter of	)	
	)	
Texas Instruments Incorporated	)	
	)	ET Docket No. _____
Request for Waiver of Section 15.255(c)(3)	)	
of the Commission’s Rules for Short Range	)	
Interactive Motion Sensing Devices	)	

**REQUEST FOR WAIVER**

Texas Instruments Incorporated (“Texas Instruments”) respectfully requests waiver of Section 15.255(c)(3) and, to the extent necessary, Section 15.255(a)(2) of the Federal Communications Commission’s rules to permit the certification and marketing of radar sensor devices (“Radar Sensors”) that use Texas Instruments’ single-chip vehicle radar systems on a chip, such as the AWR6843 and AWR6843AOP (together, the “Vehicle Sensor SOCs”), including Radar Sensors manufactured by Texas Instruments’ commercial customers, in a manner consistent with the performance conditions requested herein.<sup>1</sup> The Vehicle Sensor SOCs can, when operating at the power levels requested, enable Radar Sensors that greatly enhance passenger safety without causing harmful interference to co-frequency users. This is true both when used for fixed field disturbance sensing and for interactive motion sensing from inside the

---

<sup>1</sup> See 47 C.F.R. §§ 15.255(a)(2), (c)(3). Texas Instruments requests waiver of Section 15.255(a)(2) of the Commission’s rules to the extent that its Vehicle Sensor SOCs and Radar Sensor devices using such Vehicle Sensor SOCs are not considered “short-range devices for interactive motion sensing” or, in the alternative, employed for “fixed operation” under the rules.

vehicle cabin while the vehicle is in motion. Waiver is therefore appropriate pursuant to Section 1.3 of the Commission's rules and consistent with agency precedent.<sup>2</sup>

## **I. TEXAS INSTRUMENTS' VEHICLE SENSOR SOC's MODERNIZE IN-CABIN SENSING CAPABILITIES AND IMPROVE SAFETY**

Texas Instruments designs, manufactures, tests, and sells semiconductors that support nearly 100,000 customers worldwide in the industrial, automotive, personal electronics, communications equipment, and enterprise system industries. Texas Instruments continually strives to build innovative technologies that are not only reliable, but smaller, more efficient, and more affordable than competing products. In-object detection radar capabilities that cost \$20 million in the 1980s are available today in automotive radar chips that cost as little as \$20.

Texas Instruments' Vehicle Sensor SOC's AWR6843 and AWR6843AOP are system-on-chips that are integrated by customers into vehicle Radar Sensors that operate in the 60-64 GHz band using Frequency-Modulated Continuous Wave radar technology.<sup>3</sup> AWR6843AOP is a derivative of the AWR6843 device that integrates an antenna into the package. These millimeter wave Vehicle Sensor SOC's are the ideal solution for low power, self-monitored, ultra-accurate radar systems in the automotive space. The Vehicle Sensor SOC's would operate in a Radar Sensor at a maximum +10 dBm transmitter conducted output power, +13 dBm peak EIRP level, and +13 dBm/MHz peak power spectral density. The Vehicle Sensor SOC's would further

---

<sup>2</sup> See 47 C.F.R. § 1.3. See also *In the Matter of Google LLC Request for Waiver of Section 15.255(c)(3) of the Commission's Rules Applicable to Radars used for Short Range Interactive Motion Sensing in the 57-64 GHz Frequency Band*, Order, 33 FCC Rcd 12542 (OET 2018) ("*Google Waiver Order*") (waiving Section 15.255(c)(3) of for short range interactive motion sensing devices operating in the 57-64 GHz band at a maximum +13 dBm EIRP, +10 dBm transmitter conducted output power, +13 dBm/MHz power spectral density, and transmit duty cycle of 10 percent in any 33 milliseconds interval).

<sup>3</sup> See Texas Instruments, AWR6843 Product Details, [www.ti.com/product/AWR6843](http://www.ti.com/product/AWR6843); Texas Instruments, AWR6843AOP Product Details, [www.ti.com/product/AWR6843AOP](http://www.ti.com/product/AWR6843AOP).

operate with a maximum transmit duty cycle of 10 percent in any 33 milliseconds interval. With a body size of 10.4 mm x 10.4 mm (AWR6843) or 15 mm x 15 mm (AWR6843AOP), they are also compact.

The Vehicle Sensor SOC's enable several applications designed to maximize safety and convenience. Both products enable interior cabin sensing capabilities for use while the vehicle is in motion, including hand gesture detection, seat belt reminders, and driver vital sign monitoring (such as heart rate and breathing rate monitoring). The added bandwidth available under operation pursuant to Section 15.255(c)(3) affords greater resolution. The higher resolution results in fewer false alarms which, in turn, is likely to yield greater usage of safety systems that are built around such interactive Radar Sensors. These operations occur only within the vehicle cabin. When the vehicle is not in motion, the Vehicle Sensor SOC's enable Radar Sensors to provide occupancy detection, including child presence detection and intruder detection. These capabilities are also limited exclusively to in-cabin use. Outside the vehicle cabin, the Vehicle Sensor SOC's can enable Radar Sensors that provide kick sensor/access sensor capabilities from a stationary vehicle. Collectively, these capabilities make automobiles safer for drivers, passengers, and others on the road, as well as improve the use and functionality of automobiles generally.

## **II. TEXAS INSTRUMENTS REQUESTS WAIVER OF CERTAIN SECTION 15.255 REQUIREMENTS**

Section 15.255 governs unlicensed operation of radio frequency devices in the 57-71 GHz band.<sup>4</sup> It permits, under Section 15.255(a)(2), operation of field disturbance sensors, including vehicle radar systems, in cases where the sensors are used for fixed operation, or used

---

<sup>4</sup> See 47 C.F.R. § 15.255.

as short-range devices for “interactive motion sensing.”<sup>5</sup> The Commission’s rules define a “field disturbance sensor” as a “device that establishes a radio frequency field in its vicinity and detects changes in that field resulting from the movement of persons or objects within its range.”<sup>6</sup> The rules do not define either the term “fixed operation” or “interactive motion sensing,” except that fixed operation includes “field disturbance sensors installed in fixed equipment, even if the sensor itself moves within the equipment.”<sup>7</sup>

The rules also establish technical parameters for unlicensed use in the 57-71 GHz band. For sensors occupying more than 500 megahertz of bandwidth at 61-61.5 GHz, Section 15.255(c)(3) provides that the peak transmitter conducted output power must not exceed -10 dBm, and the peak EIRP level must not exceed 10 dBm.<sup>8</sup> The Commission established its Part 15 rules to “achieve more effective use of the radio frequency spectrum while providing additional technical and operational flexibility in the design, manufacture and use of non-licensed devices.”<sup>9</sup> The rules “are designed to ensure that unlicensed devices have a low probability of causing harmful interference to other users of the radio spectrum.”<sup>10</sup>

---

<sup>5</sup> 47 C.F.R. § 15.255(a)(2).

<sup>6</sup> 47 C.F.R. § 15.3(l).

<sup>7</sup> 47 C.F.R. § 15.255(a)(2).

<sup>8</sup> 47 C.F.R. § 15.255(c)(3).

<sup>9</sup> *Amendment of the Rules Regarding Operation of RF Devices Without an Individual License*, Report and Order, 4 FCC Rcd 17710, ¶ 1 (1989). *See id.* (“This objective will be achieved by: 1) providing for the production of equipment for non-licensed use on almost any frequency with minimal restrictions on usage, bandwidth, modulation technique and other technical parameters; 2) establishing uniformity among the technical standards for various non-licensed operations; 3) clarifying and simplifying our administrative requirements; and, 4) retaining, to the greatest extent possible, operations currently permitted under the rules.”).

<sup>10</sup> *Google Waiver Order*, ¶ 2.

Texas Instruments requests waiver of Section 15.255(c)(3) restricting use of field disturbance sensors to allow the Vehicle Sensor SOCs and Radar Sensors incorporating the Vehicle Sensor SOCs to operate at a maximum +10 dBm transmitter conducted output power, +13 dBm peak EIRP level, +13 dBm/MHz peak power spectral density, and within a maximum transmit duty cycle of 10 percent in any 33 milliseconds interval. Additionally, Texas Instruments requests waiver of Section 15.255(a)(2) to the extent that its devices are not considered “short-range devices for interactive motion sensing” or, in the alternative, employed for “fixed operation” under the rules.

The Commission may waive any of its rules if there is “good cause” to do so.<sup>11</sup> Waiver is appropriate where “special circumstances warrant a deviation from the general rule” and “such deviation will serve the public interest” better than strict adherence to the rule.<sup>12</sup> Generally, the Commission will grant a waiver of its rules if the relief requested would not undermine the policy objective of the rule in question and would otherwise serve the public interest.<sup>13</sup>

In this case, waiver of Section 15.255(c)(3) and, if necessary, Section 15.255(a)(2) for the Vehicle Sensor SOCs and for Radar Sensor devices that incorporate the Vehicle Sensor SOCs would serve the public interest. Allowing operation at the requested power levels or for in-cabin, interactive motion sensing while the vehicle is in motion, will not increase the potential for harmful interference to other users in the band. The Commission has assessed and concurred with technical studies in the record demonstrating that the operations requested here (*i.e.*, those

---

<sup>11</sup> 47 C.F.R. § 1.3.

<sup>12</sup> *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990) (*Northeast Cellular*).

<sup>13</sup> See *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969) (*WAIT Radio*); *Northeast Cellular*, 897 F.2d at 1166.

with a transmitter output power limit of +10 dBm, peak EIRP level of +13 dBm, peak power spectral density of +13 dBm/MHz, and maximum transmit duty cycle of 10 percent in any 33 milliseconds interval) minimize the potential effects on authorized passive sensors in the Earth Exploration Satellite Service (“EESS”) and the Radio Astronomy Service (“RAS”) or on other unlicensed operations in the 60-64 GHz band.<sup>14</sup> Waiver of Section 15.255(c)(3) is therefore consistent with, and would not undermine, the rules’ purpose.

Waiver of Section 15.255(a)(2) may not be necessary, as the Vehicle Sensor SOC’s are integrated in Radar Sensors that are used as short-range devices for interactive motion sensing and thus permitted for operation within the 57-71 GHz band. Texas Instruments’ Vehicle Sensor SOC’s enable hand gesture detection capabilities, for example, similar to capabilities of Google LLC’s Project Soli devices, which the Commission has treated as interactive motion sensing capabilities.<sup>15</sup> Interior cabin sensing capabilities that enable seat belt reminders, occupancy

---

<sup>14</sup> See *Google Waiver Order*, ¶ 11 (“We believe that any coexistence and interference concerns have been adequately addressed with the updated operational parameters and the supporting studies and provide us confidence that all users of the 57-64 GHz band will be able to operate without experiencing harmful interference.”) See generally, Google LLC’s Request for Waiver of Section 15.255(c)(3) the Commission’s Rules (filed Mar. 7, 2018) (including Attachment, *Assessing the Interference of Miniature Radar on Millimeter Wave 60 GHz Wi-Fi Simulation Study*); Letter from Megan Stull, Counsel, Google LLC to Marlene Dortch, Secretary, FCC, ET Docket No. 18-70 (filed Jun. 8, 2018) (including Attachment A, *Assessing the Interference of Miniature Radar on Millimeter Wave 60 GHz Wi-Fi — Supplemental Analysis*, Attachment B, *Measurement Study on Soli/802.11ad Coexistence*, and Attachment C, *Compatibility between Earth Exploration-Satellite Service Sensors and Airborne Use of Project Soli Devices at 57.5 to 63.5 GHz*); Letter from Megan Stull, Counsel, Google, LLC to Marlene H. Dortch, Secretary, FCC, ET Docket No. 18-70 (filed Oct. 12, 2018) (including Attachment A, *Gesture Classification Performance Estimate under Regulatory Limits*, and Attachment B, *Supplement to Measurement Study on Soli/802.11ad Coexistence*).

<sup>15</sup> See *Office of Engineering and Technology Seeks Comment on Google LLC’s Request for Waiver of Section 15.255(c)(3) of the Commission’s Rules Applicable to Radars used for Short Range Interactive Motion Sensing in the 57-64 GHz Frequency Band*, Public Notice, 33 FCC Rcd 2206 (OET 2018) (seeking comment on Google’s request for waiver of Section 15.255(c) to allow for the marketing and certification “of interactive motion sensing technology it has

detection (including child and intruder detection), and vital monitoring are also short-range and interactive motion sensing. This is additionally true of the Vehicle Sensor SOC's that enable kick sensor access capabilities. Should the Commission determine nevertheless that any such capability is neither interactive motion sensing nor, in the alternative, employed for fixed operation under its rules, waiver of Section 15.255(a)(2) would be consistent with, and would not undermine, the rules' purpose to maximize spectrum use while also mitigating the risk of harmful interference to other users of the spectrum.

The public interest benefits of granting the requested waivers are compelling. No parent wants to experience the heartbreak of forgetting their child in the back seat of their parked car where temperatures can quickly climb. Texas Instruments' in-cabin Vehicle Sensor SOC's can enable the design and development of Radar Sensors to detect children in the vehicle and remind drivers of their presence before exiting the vehicle. The Vehicle Sensor SOC's can also enable the design and development of contactless vital sign monitoring Radar Sensors that can also detect fatigue or sleepiness and alert drivers—prompting them to take a break, making the roads safer for everyone. Vehicle Sensor SOC's that enable hand gesture control capabilities in a Radar Sensor can further increase safety and convenience. As an alternative to the physical press of a button or voice control, drivers can control certain vehicle features using basic hand gestures, providing for fewer distractions from the road.

Waiver in this case is consistent with the Commission's decision to grant Google LLC's waiver of Section 15.255(c)(3) for its Project Soli devices and to treat the devices' hand gesture capabilities as "interactive motion sensing capabilities."<sup>16</sup> Like Google, Texas Instruments seeks

---

developed under its Project Soli that can be used to enable touchless control of device functions and features").

<sup>16</sup> See *Google Waiver Order*.

a rule waiver to permit the certification and marketing of field disturbance sensors operating at identical power limits and that should reasonably be considered short-range devices for interactive motion sensing. Both Google’s Soli sensor and Texas Instruments’ Vehicle Sensor SOC use radar sensing capabilities to enable control device functions or features through hand movement at short ranges. The additional Vehicle Sensor SOC capabilities that can be enabled in a Radar Sensor operate by sensing and responding to movements, both overt and subtle, of vehicle occupants who thereby interact with vehicle systems.

A decision to streamline future waiver petitions for products that incorporate a device certified pursuant to waiver (so called “me too” waivers) is also consistent with Commission precedent. In *Alcatel USA, Inc.*, the Commission established a streamlined procedure for future Asynchronous Digital Subscriber Line (“ADSL”)-related waiver requests of Part 68 of the Commission’s rules as an interim procedure, until the agency completed its proceeding to streamline or eliminate Part 68 requirements.<sup>17</sup> The Commission elected to forego the public notice and comment process for waiver petitions where the petitioners certified conformance with the performance conditions adopted in *Alcatel USA, Inc.*<sup>18</sup> It found that further waivers “will provide more innovative equipment and choices for consumers, and are therefore in the public interest.”<sup>19</sup> Here too, the public will be served by streamlining the process to deliver

---

<sup>17</sup> See *Alcatel USA, Inc., Petition for Waiver of the Signal Power Limitations Contained in Section 68.308(e)(1) of the Commission’s Rules*, Memorandum Opinion and Order, 15 FCC Rcd 4388 (WCB 2000).

<sup>18</sup> See *id.*, ¶¶ 25, 26 (“Specifically, in the future, parties seeking waiver of ADSL modems may submit a letter to the Chief Network Services Division, Common Carrier Bureau, certifying that the equipment for which waiver is requested complies with the two performance conditions listed above. The waiver request must be signed by a company representative or officer responsible for its truthfulness.”).

<sup>19</sup> *Id.*, ¶ 25.



advanced technologies and greater choice to consumers. To protect other operators, the Commission should require petitioners to certify that their devices will comply with the performance conditions proposed herein, namely that the devices operate in the 57-71 GHz band at a maximum +10 dBm transmitter conducted output power, +13 dBm peak EIRP level, +13 dBm/MHz peak power spectral density, and transmit duty cycle of 10 percent in any 33 milliseconds interval. This streamlined process would be an appropriate interim procedure, pending Commission action in a rulemaking proceeding to update Section 15.255. If additional assurance of compliance with the waiver requested herein is required in the certification process, the Commission also has the flexibility to employ the Pre-Approval Guidance (“PAG”) procedure described in KDB Publication 3886241.<sup>20</sup>

---

<sup>20</sup> See *e.g.*, Pre-Approval Guidance List, 388624 D02 Pre-Approval Guidance List v16r12 (rel. Mar. 19, 2021).

#### IV. CONCLUSION

Texas Instruments accordingly requests waiver of Section 15.255(c)(3) and, to the extent necessary, Section 15.255(a)(2) of its rules to permit the certification and marketing of devices incorporating vehicle radar sensor system-on-chips such as AWR6843 and AWR6843AOP, as well as future devices incorporating the Vehicle Sensor SOC's for use consistent with this request. Grant would serve the public interest by enabling use of innovative vehicle safety technologies with minimal risk of harmful interference to licensed or unlicensed users in the 57-71 GHz band.

Respectfully submitted,

/s/ Scott D. Delacourt

Scott D. Delacourt

David E. Hilliard

Madeleine M. Lottenbach

WILEY REIN LLP

1776 K Street NW

Washington, DC 20006

*Counsel for Texas Instruments Incorporated*

April 7, 2021